

REMARKS

Claims 1-13 and 19-26 are pending in the application. Reconsideration of the application in light of the following remarks is respectfully requested.

**I. REJECTION OF CLAIMS 1-2, 6, 9-10, 13, 19-21 AND 24-26 UNDER
35 U.S.C. § 103(a)**

Claims 1-2, 6, 9-10, 13, 19-21 and 24-26 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,078,738 (Garza et al.) in view of U.S. Patent No. 5,801,954 (Le et al.). Withdrawal of the rejection is respectfully requested for at least the following reasons.

i. The combination of Garza et al. and Le et al. is improper because no motivation exists for the combination.

It is conceded that art may be combined together properly when one of ordinary skill in the art is motivated to do so. Further, it is well established that motivation for combining references may be found within the prior art references themselves (explicitly or implicitly), in the general knowledge of those skilled in the art, or in the nature of the problem to be solved. Ruiz v. A.B. Chance Co., 357 F.3d 1270, 1276 (Fed. Cir. 2004). Nevertheless such motivation may not rely on a vague notion of common technology, ***but instead must be clear and particular.*** In re Dembiczak, 175 F.3d 994, 999 (Fed. Cir. 1999). It is respectfully submitted that under a proper evaluation of the cited art, taken as a whole, one of ordinary skill in the art would not be motivated to combine together the cited art for at least the following reasons.

- ***Garza et al. is not concerned with OPC designs, but instead is directed toward simulation software to emulate a given lithography process.***

Garza et al. do not evaluate an OPC design, rather they teach ***optimization of simulation software*** for simulation of a lithography process. As taught in the

reference, mask data is input to the simulation software, which generates a simulation output representing a feature or features corresponding to the input data (a first data set, see, e.g., Col. 3, Ins. 3-6). Actual features are then generated using an actual lithography process (same parameters as in the software simulation) and measured as a second data set (see, e.g., Col. 3, Ins. 45-47, Col. 9, Ins. 14-21). The first and second data sets are compared and differences associated therewith are saved as an error data set (see, e.g., Col. 3, Ins. 47-50, Col. 9, Ins. 24-29), ***however, the error data set is not evaluated with respect to mask data, but instead is used to modify the simulation software so as to reduce differences between the simulation output and the actual generated features.*** (See, e.g., Abstract, Col. 3, Ins. 49-52, Col. 9, Ins. 26-37). Consequently, one of ordinary skill in the art, upon evaluating Garza et al. as a whole, ***would not focus on the substance of the mask data***, but rather would look to the manner in which the simulation software operated on a piece of input data to form a simulation output. Accordingly, the ***content*** of the input data is not of import.

- ***Le et al. stands in stark contrast to Garza et al. in that Le et al. focus on the content of the input data in a simulation process and ignore the simulation mechanism that operates on the input data.***

Le et al. disclose a process for design and evaluating a mask layout. The process begins with an initial binary mask layout 10, and a design program is employed to generate a mask layout 14 that incorporates phase shift and/or OPC modifications associated therewith (see, e.g., Col. 3, Ins. 52-64). The actual mask layout 14 is then employed as input data provided to a simulator (an aerial image simulation program 16) that generates a simulation output 18 (see, e.g., Col. 4, Ins. 8-12). The simulation output 18 is then fed to a data integrity verification and correction program 20 that compares the simulation output 18 to the original binary mask layout data 10. If the differences between the simulation output 18 and the original data 10 are within an acceptable range, the mask layout 14 associated therewith is employed; otherwise the

mask layout data 14 is modified (phase shift and/or OPC modifications) and the process is repeated. (See, e.g., Col. 4, Ins. 18-34).

As can be seen from the teaching of Le et al., ***the mask simulation ignores the recognition within Garza et al. that the simulation software itself is a significant contributor to error in the simulation output.*** Rather, one of ordinary skill in the art, upon properly evaluating Le et al. as a whole, would not consider teachings associated with modifications in simulation software. Consequently, one of ordinary skill in the art would not be motivated to combine the teaching of Garza et al. with that of Le et al. because ***each reference is directed toward differing problems.*** Namely, Garza et al. is directed to software simulation errors and modifications thereto (while ignoring the substantive content of the input data), while Le et al. focus on modifications to input data and is unconcerned with the mechanism by which the simulation software operates. One of ordinary skill in the art would therefore appreciate the divergence in the teaching of the cited art, and therefore would not be motivated to combine together the references.

Since no motivation exists for the combination of Garza et al. and Le et al., the combination is improper. Accordingly, the claims are non-obvious over the cited art, and withdrawal of the rejection is respectfully requested.

II. REJECTION OF CLAIMS 3-5, 7-8, 11-12, AND 22-23 UNDER 35 U.S.C.

§ 103(a)

Claims 3-5, 7-8, 11-12 and 22-23 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Garza et al. in view of Le et al., and further in view of a number of tertiary references (U.S. Patent No. 5,962,173 (Leroux, claims 3 and 22), U.S. Patent No. 5,698,346 (Sugawara, claim 4), U.S. Patent No. 6,268,093 (Kenan, claims 5, 7 and 23), and U.S. Patent No. 5,723,233 (Garza '233, claim 8)).

As stated above, the combination of Garza et al. and Le et al. is improper, and none of the tertiary references highlighted above remedy the deficiencies in the primary

references. Consequently, the above claims are patentable over the cited art for at least the same references.

- i. ***Neither the primary references nor Sugawara teach or suggest a second image determined from a corresponding segment of another feature from a different mask fabrication process, as recited in claim 4.***

As stated above, the combination of Garza et al. and Le et al. is improper. However, even if such references could be properly combined, the combination does not teach or suggest the invention of claim 4. Claim 4 recites that the second image used to facilitate analysis of the first image is from a corresponding feature ***made from a different fabrication process***. For example, as stated in applicants' specification on p. 5, Ins. 13-16 and p. 9, Ins. 24-28, the present invention contemplates evaluating a single OPC design with differing mask fabrication processes. Neither cited reference teach or suggest this feature. ***Garza et al. use the same fabrication process*** and iteratively attempt to modify simulation software to closely approximate that single fabrication process. Le et al. teach modification of input data, however, such data does not reflect variation in the mask fabrication process, ***but instead reflects variations in the mask itself fabricated by a single mask fabrication process***. Therefore neither of the primary references teach or suggest the invention of claim 4.

In addition, Sugawara fails to remedy the deficiencies in the primary art. Claim 4 recites that the second image is determined from a corresponding segment of another feature having a different mask fabrication process. Sugawara does not teach a second image from a different mask fabrication process as claimed, but rather teaches ***a second image from a different lithography (exposure) process using the same mask***. As discussed in Col. 9, In. 60 - Col. 10, In. 48, for example, photoresist layers are exposed through a mask (made from a single mask fabrication process under a variety of differing exposure conditions, and variations associated therewith are then evaluated. Sugawara neither teaches nor suggests a second image from a different

mask fabrication process as claimed. Therefore the combination of art fails to teach the present invention. Accordingly, withdrawal of the rejection is respectfully requested.

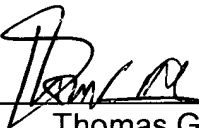
III. CONCLUSION

For at least the above reasons, the claims currently under consideration are believed to be in condition for allowance.

Should the Examiner feel that a telephone interview would be helpful to facilitate favorable prosecution of the above-identified application, the Examiner is invited to contact the undersigned at the telephone number provided below.

Should any fees be due as a result of the filing of this response, the Commissioner is hereby authorized to charge the Deposit Account Number 50-1733, AMDP440USA.

Respectfully submitted,
ESCHWEILER & ASSOCIATES, LLC

By 
Thomas G. Eschweiler
Reg. No. 36,981

National City Bank Building
629 Euclid Avenue, Suite 1210
Cleveland, Ohio 44114
(216) 502-0600

CERTIFICATE OF MAILING (37 CFR 1.8a)

I hereby certify that this paper (along with any paper referred to as being attached or enclosed) is being deposited with the United States Postal Service on the date shown below with sufficient postage as first class mail in an envelope addressed to: Mail Stop Non-Fee Amendment, Commissioner for Patents, P.O. Box 1450 Alexandria, VA 22313-1450

Date: March 17, 2004


Christine Gillroy